

# California Industry Energy Advisory Workshop

Real-Time Pricing  
Programs



Infotility

More Power To You

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# Load management: Value & Timing

## Value

- Conservation -- Good (all kWh created equal)
- Load Management -- Better (time value of electricity)

*LM = Dispatchable Demand Reductions (10 - 15%)*

## Timing

- 2001/2002: Preserve Reliability
- 2003/beyond: Lower Prices



# Uncertainty in the Supply-Demand balance

- Contributing Factors
  - Weather – heat increases cooling demand
  - Unexpected power plant shut down
  - Uncertain economic growth
- Types of Reserves
  - Regulating – follow instantaneous fluctuations
  - Spinning and Non-Spinning – must be available in 10 minutes
  - Replacement reserves – must be available in 60 minutes
  - Installed reserves – must be available within a day

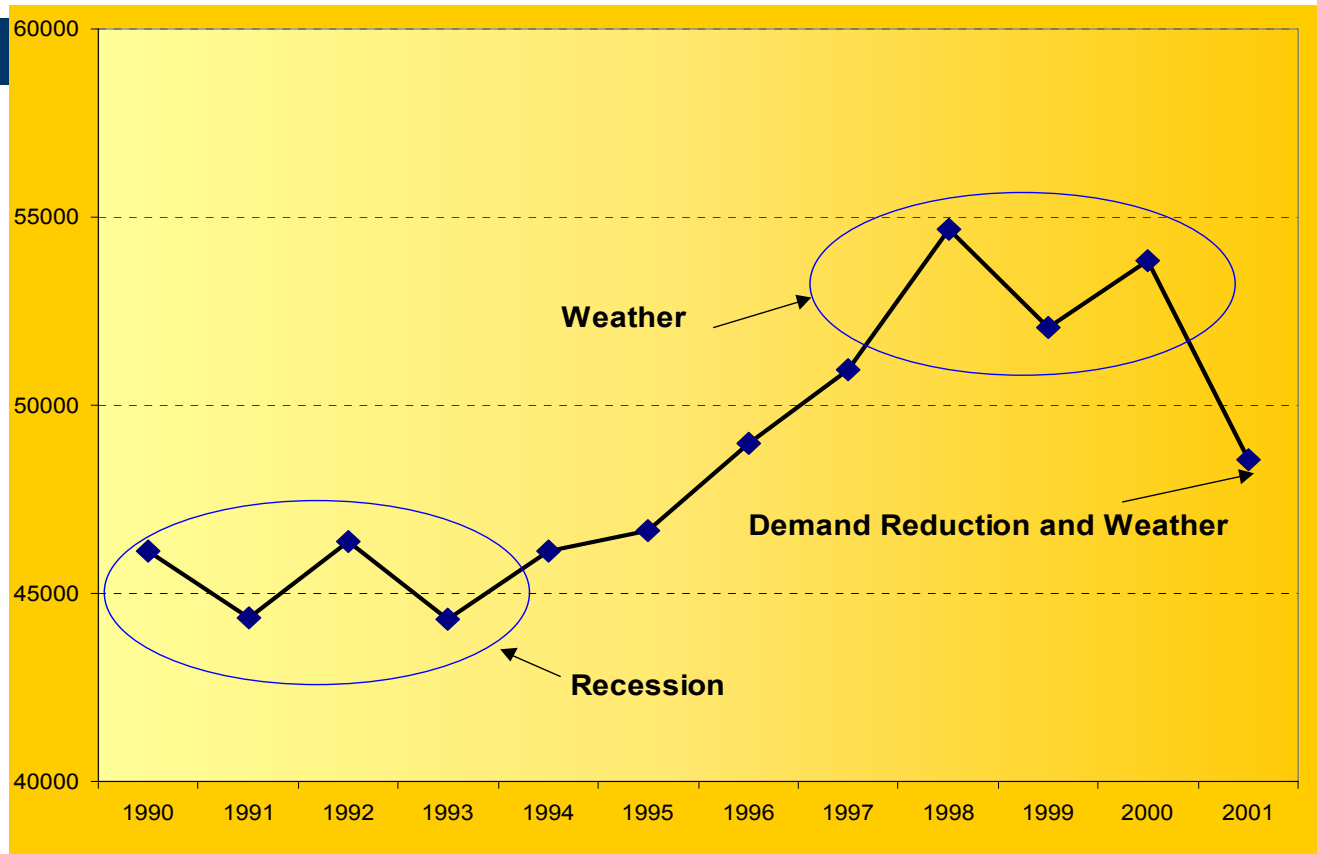


# Reflections on 2001

- Having a modest amount of retail load sensitive to wholesale prices would have significantly mitigated price spikes
- Interruptible and curtailable loads have the potential to mitigate price spikes
- Distributed generation can play a significant role in the near term
- Load management is the killer app



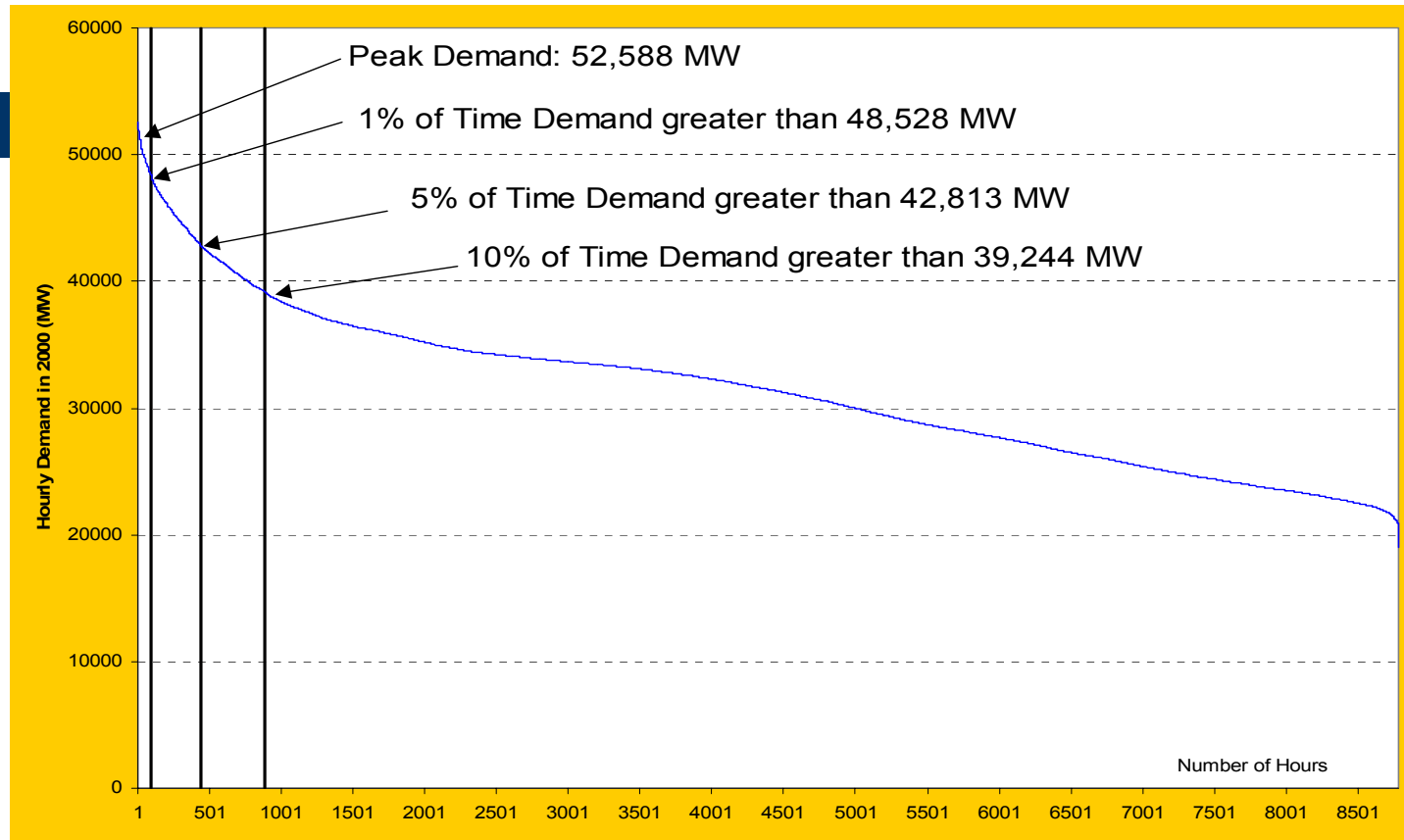
## Peak Demand Influenced by Economics and Weather



Source: CEC



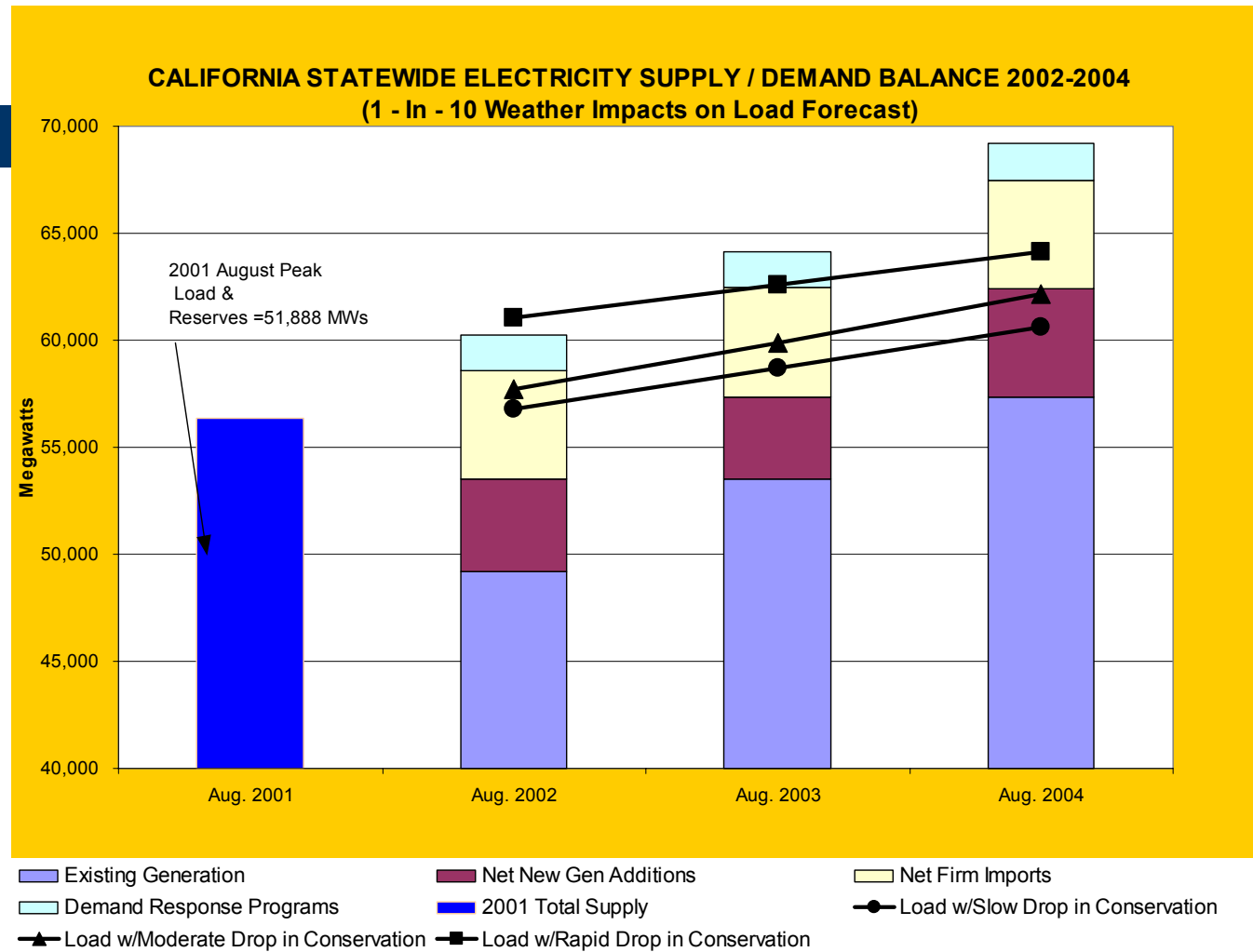
# Demand Near Peak Level in Very Few Hours



Source: CEC



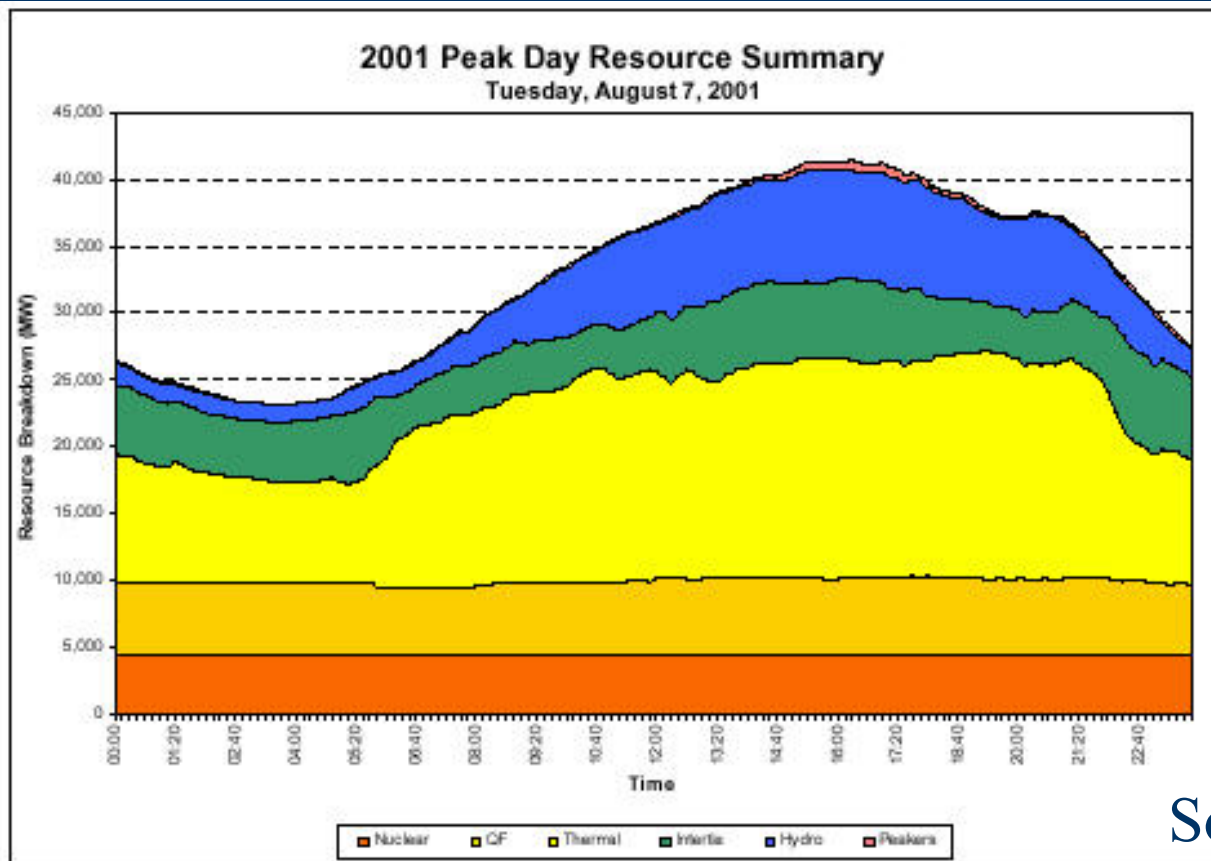
# Capacity Adequacy Without Uncertainty



Source: CEC



# 2001 Peak Day Resource Summary



Source: CAISO

Figure I-A: The ISO Control Area Resource Breakdown by Technology for August 7, 2001



# ISO 2002 Summer Capacity Outlook

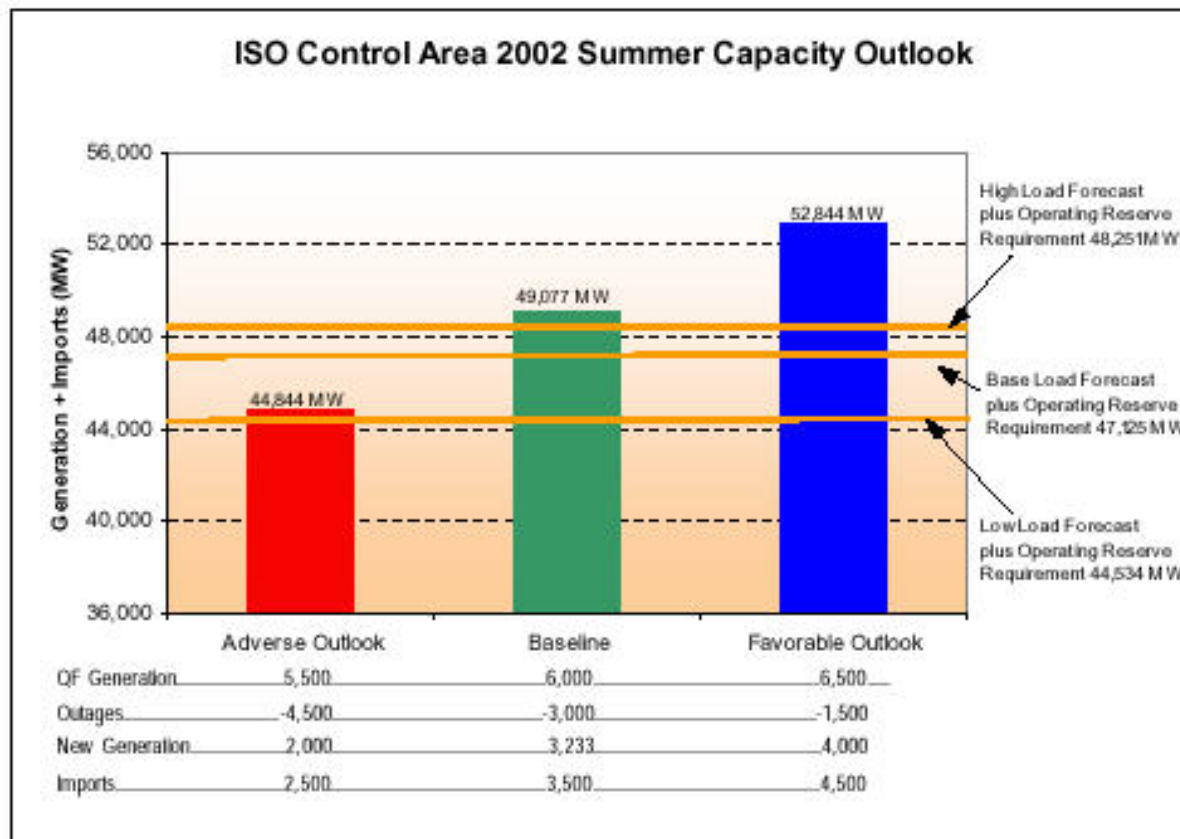


Figure 2: The ISO Control Area 2002 Summer Capacity Outlook

Source: CAISO



# Energy Growth 1998 - 2001

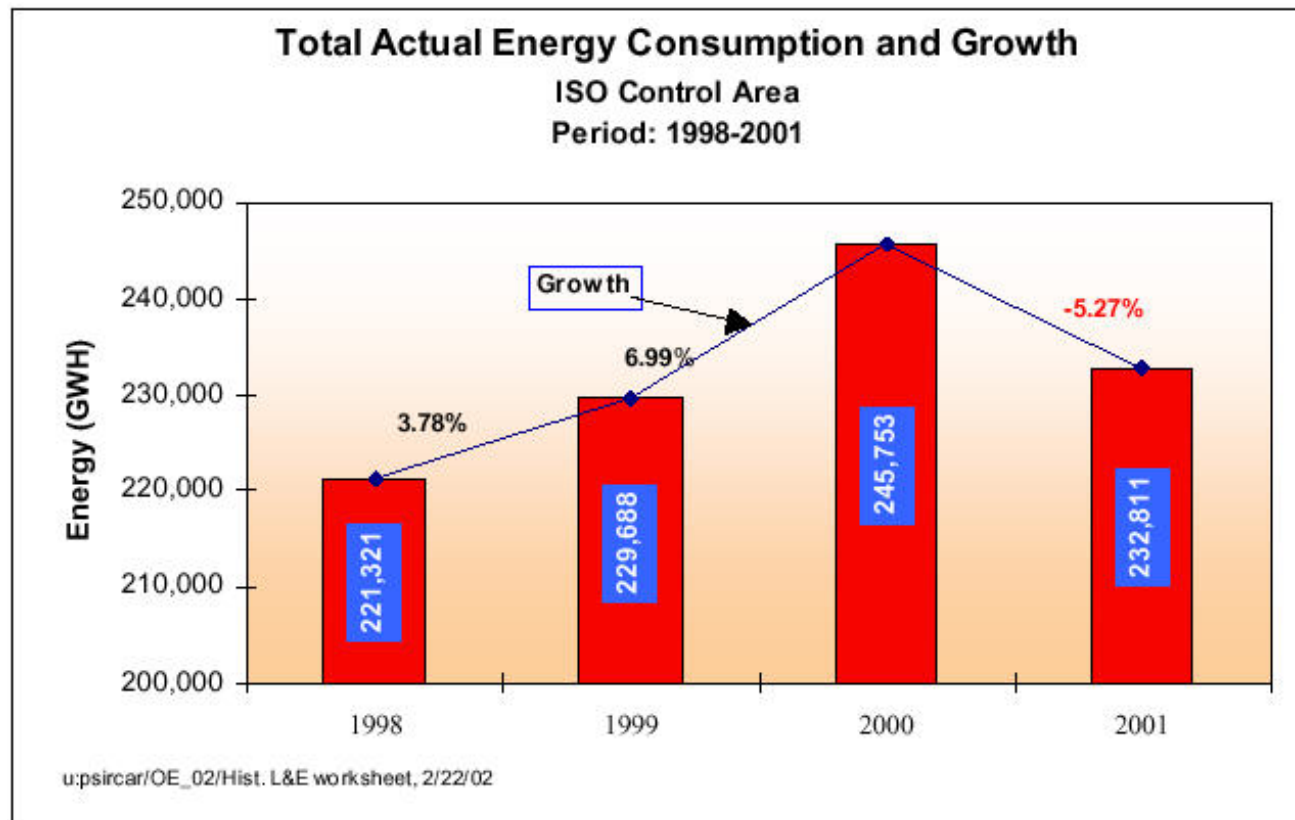


Figure III-C: The Total Actual Energy Consumption and Growth

Source: CAISO



# California Peak Demand

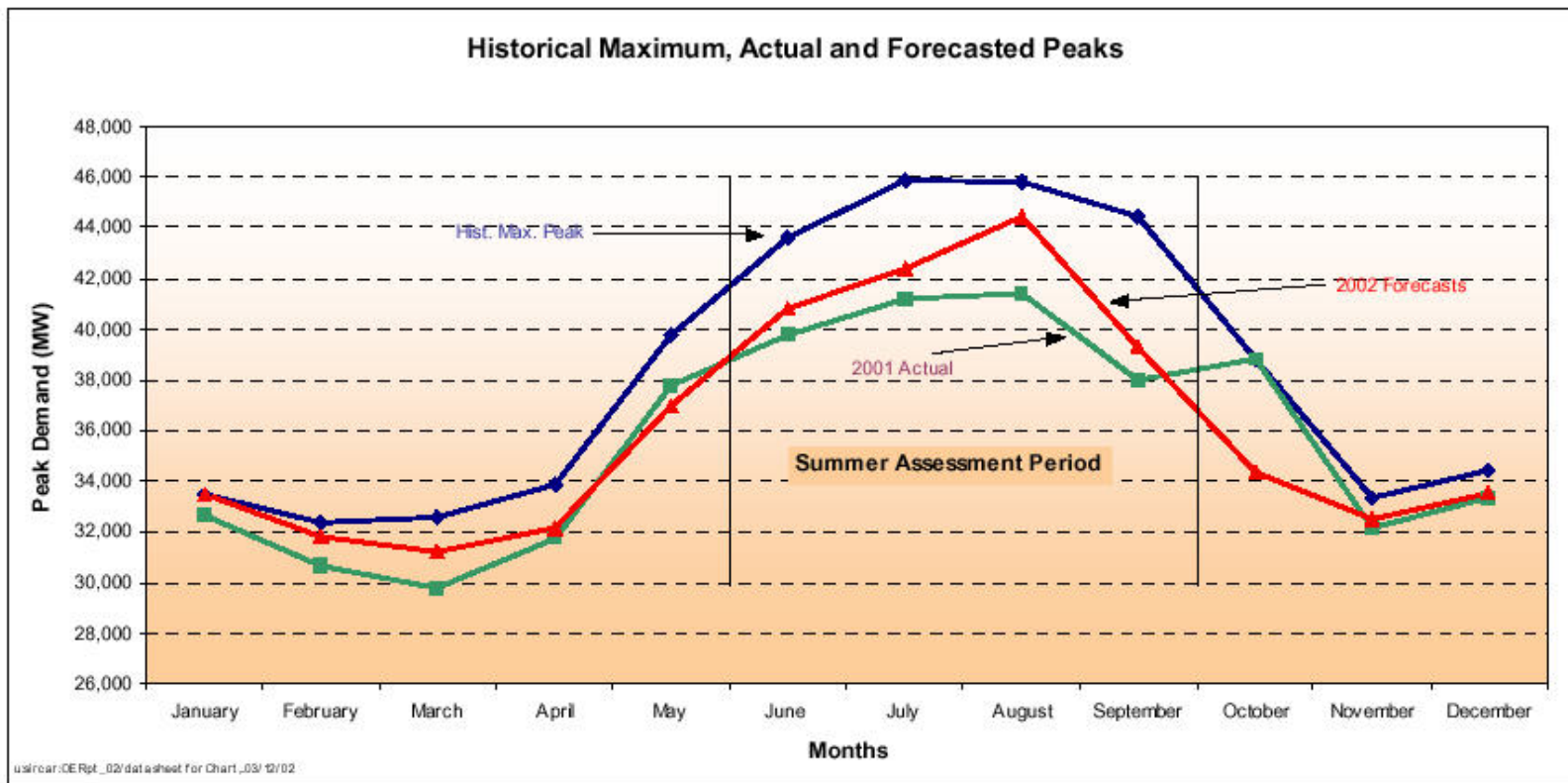
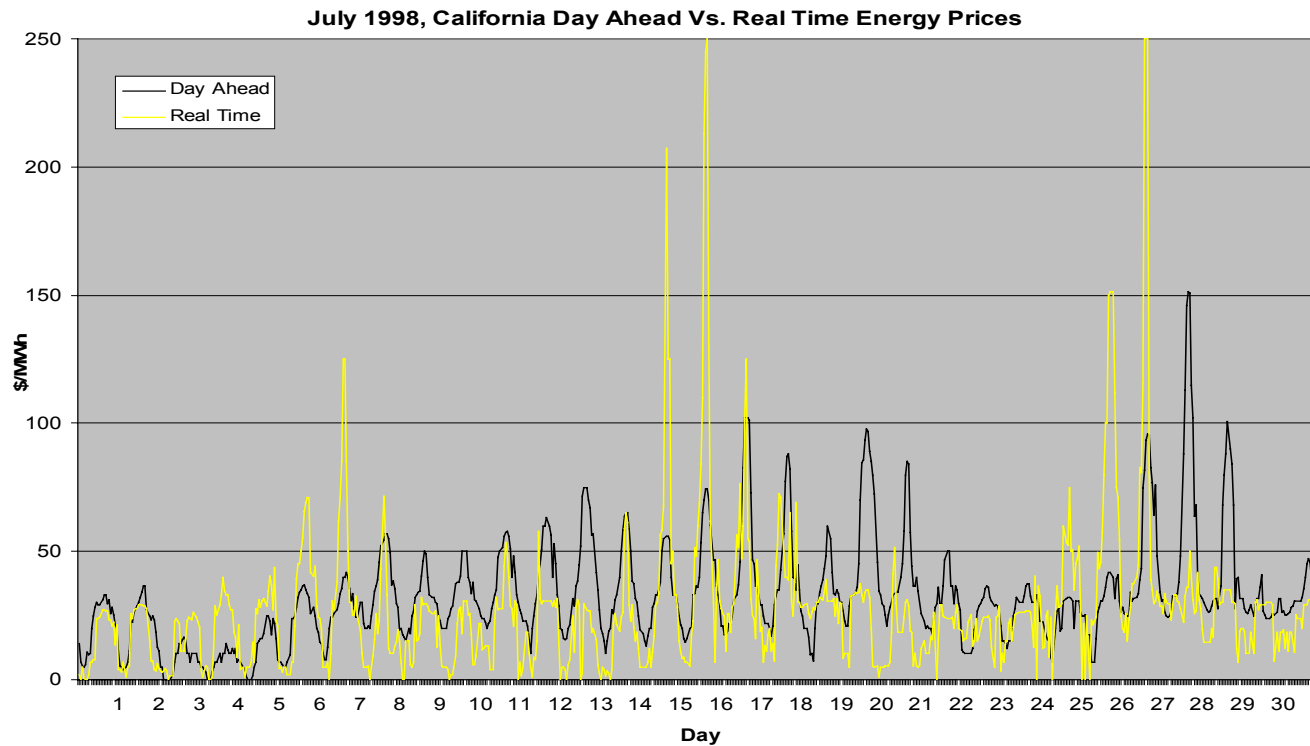


Figure 1: Historical Maximum, Actual and Forecasted Peak Load Demand Source: CAISO



# Price Volatility is Real Time





# Impact of Energy Crisis

## EXHIBIT 30

### IMPACT OF ENERGY CRISIS

Percentage of survey respondents; 100% = 512

#### Business issue

Sales

21

56

2.4

Investment plans

26

50

2.6

Consideration of  
relocation

20

58

2.3

Ability to attract talent

18

56

2.3

Profit margin

43

33

3.2

Competitiveness relative  
to other companies in  
our industry

42

36

3.1

Agree or strongly agree  
Disagree or strongly disagree

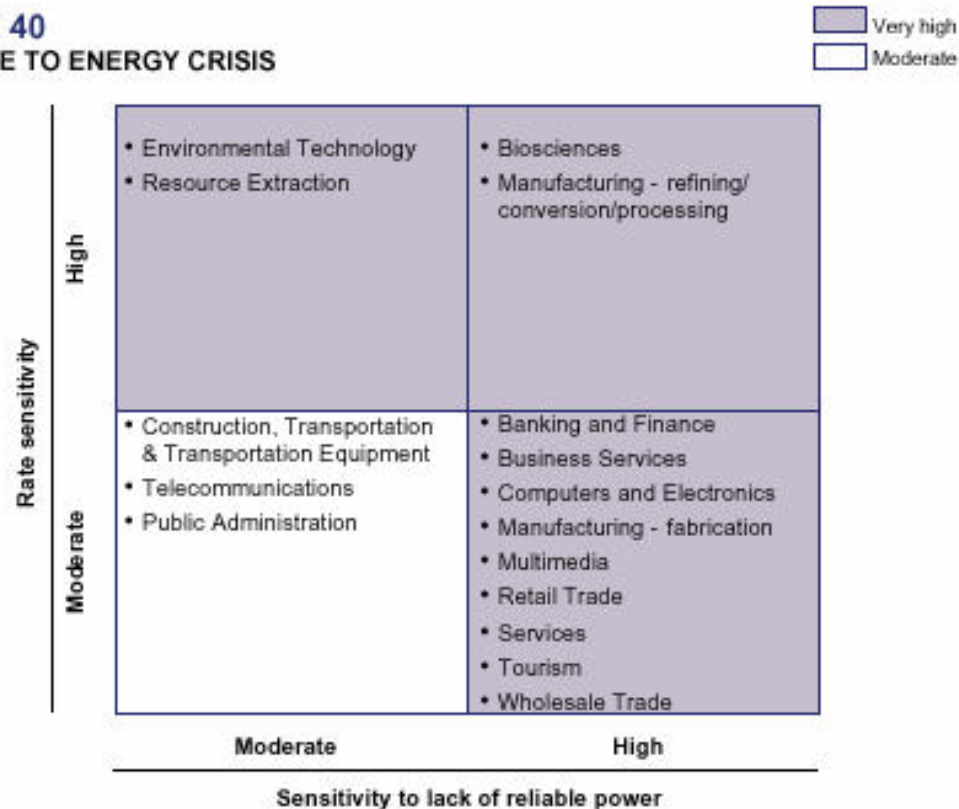
#### Mean

1 = strongly disagree,  
5 = strongly agree



# Exposure to the Crisis by Sector

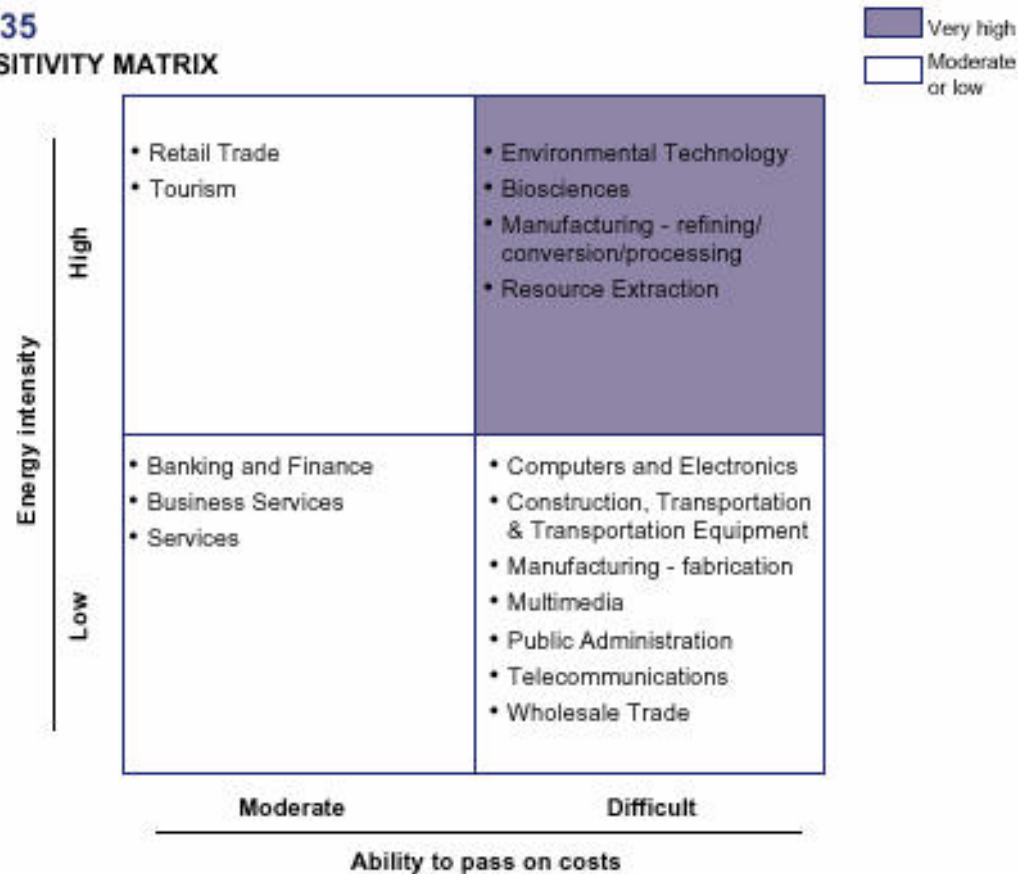
**EXHIBIT 40**  
**EXPOSURE TO ENERGY CRISIS**





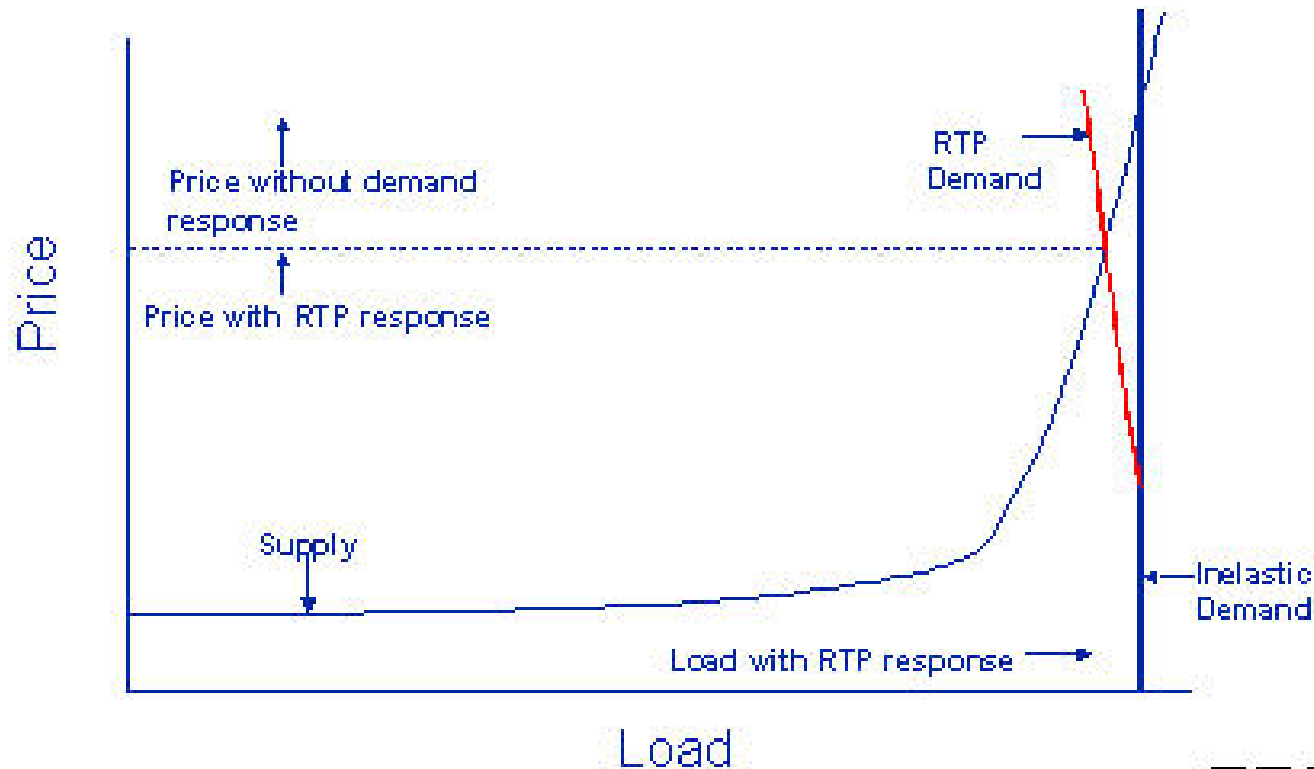
# Rate Sensitivity

**EXHIBIT 35**  
**RATE SENSITIVITY MATRIX**





# Effect of RTP on Wholesale Prices

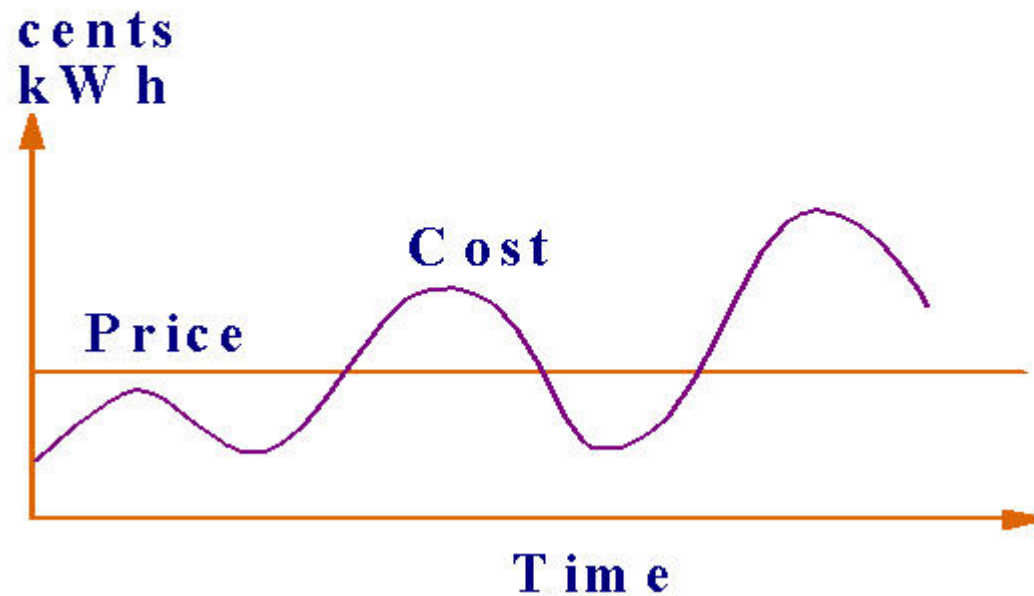




# Unit Cost by Hour vs. Price by Hour

Figure 2.

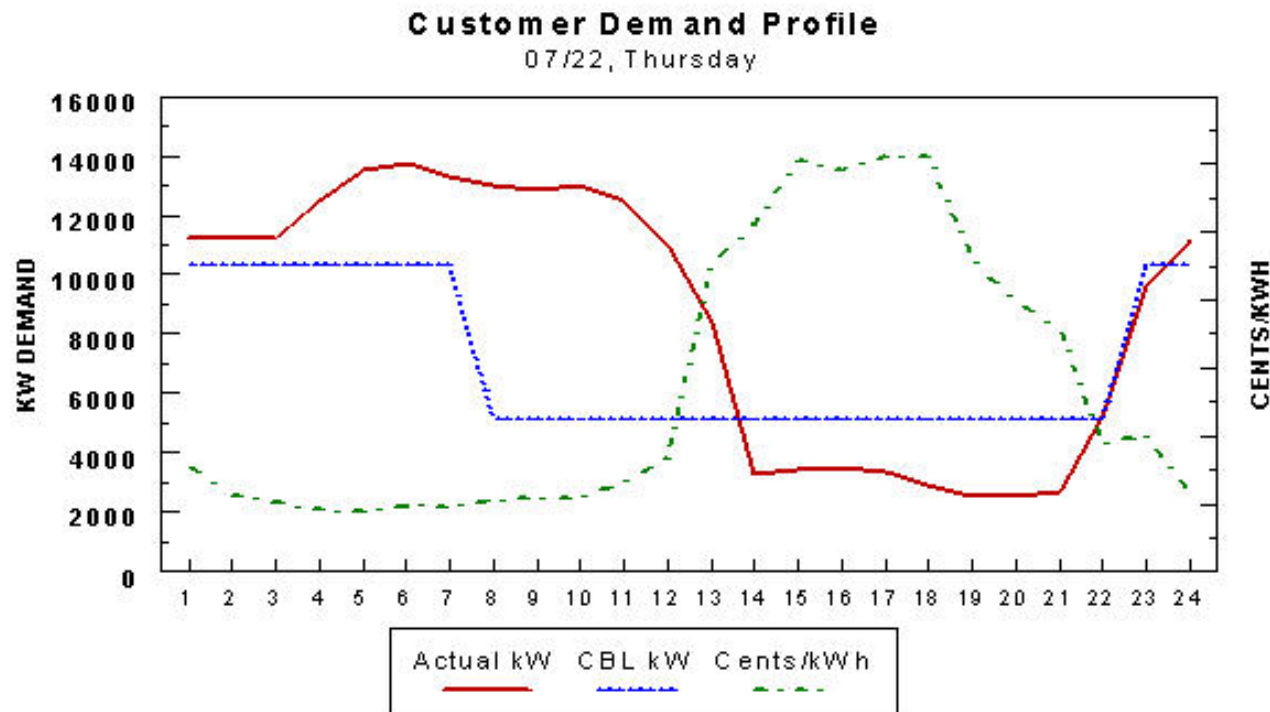
Unit Cost by Hour Versus  
Unit Price by Hour





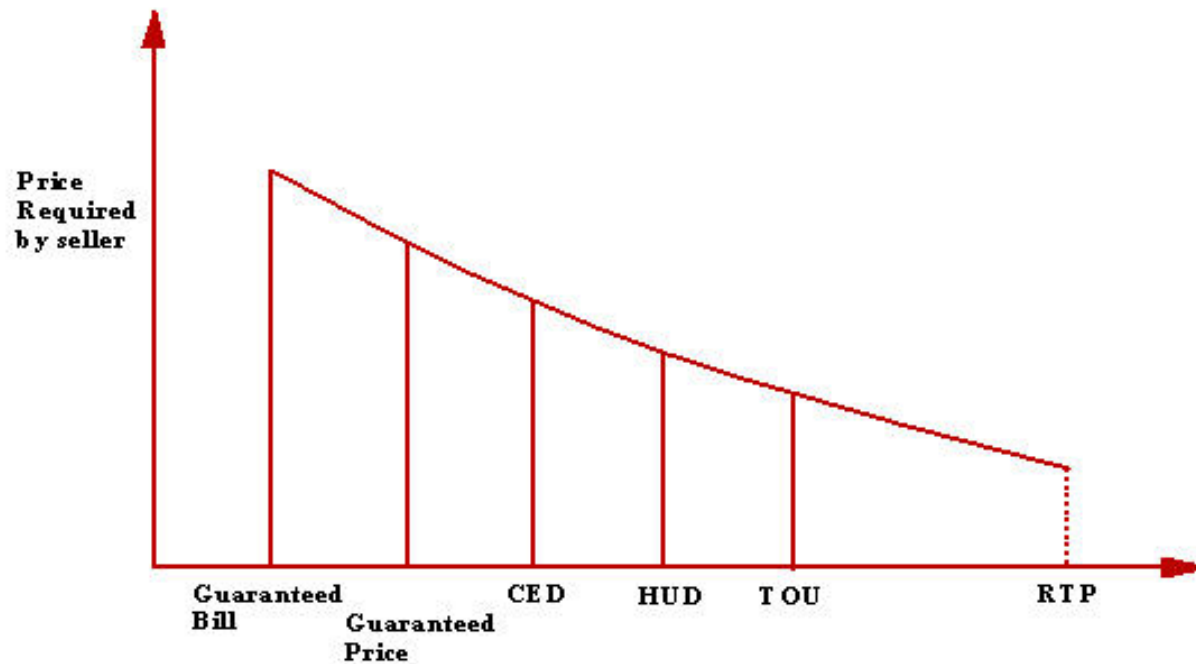
# Customer Demand Profile

Figure 1.





# Rate Complexity



## RATE COMPLEXITY

Note: CED stands for customer, energy, and demand rates. HUD stands for hours use of demand rates.



# Risk Allocation

## Risk Differentiated Pricing Products

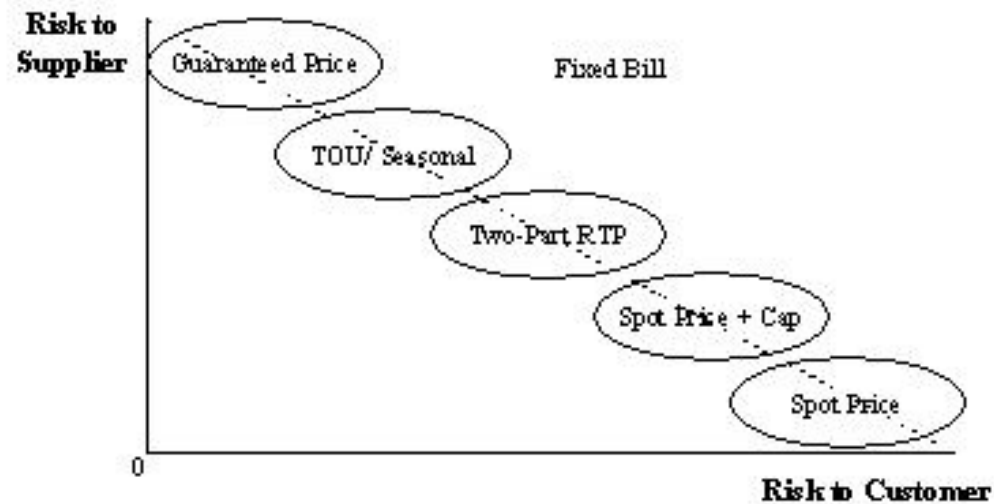


Figure 1-1  
Risk Differentiated Pricing Products



# RTP Pricing – Many variations

- Guaranteed prices year-round for unlimited purchases of electricity
- Guaranteed prices by season and/or time-of-day for unlimited purchases of electricity
- Guaranteed prices for a block of electricity, expressed in the form of a forward contract
- Discounted and guaranteed prices year-round, with the possibility of curtailment or interruption of service for a certain number of hours, under prespecified conditions and trigger points



## RTP Pricing Options (cont.)

- Coincident peak pricing for unlimited quantities of electricity, where the prices in all tiers except a critical tier vary by time-of-day in a predetermined fashion (there is a very high predetermined price in the critical tier whose timing is determined in real time, based on market conditions)
- Spot pricing, with caps and floors, for unlimited quantities of electricity
- Spot pricing for all days of the year; however, the customer buys an option to be excluded from facing spot prices during a few days when critical business conditions prevent modification of baseline schedules



## RTP Pricing (cont. 2)

- Two-part pricing, with an access charge for predetermined baseline quantity usage, often specified on a customer-specific basis; there are also spot prices for variations from the baseline
- Spot pricing for unlimited quantities of electricity, often called one-part RTP



# RTP Issues

- One part vs Two Part
- Customer vs Class revenue neutrality
- Voluntary vs Mandatory
- Simplicity vs Complexity
- Price vs Reliability



# Impact of a 2-Tier Tariff

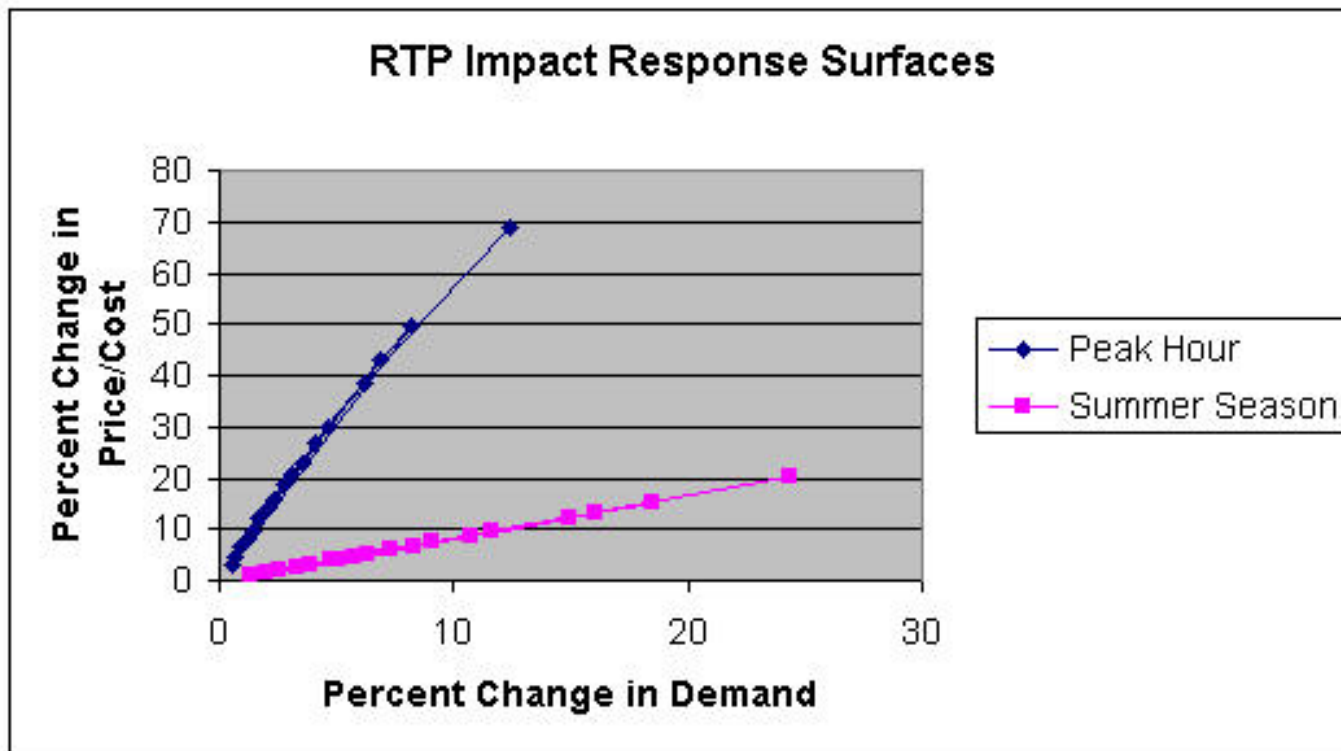
## Real-Time Pricing

Net impact of changes in energy usage  
compared to base

		Energy usage above CBL	Energy Usage below CBL
RTP	above Tariff	Higher Bill	Lower Bill
	below Tariff	Lower Bill	Higher Bill

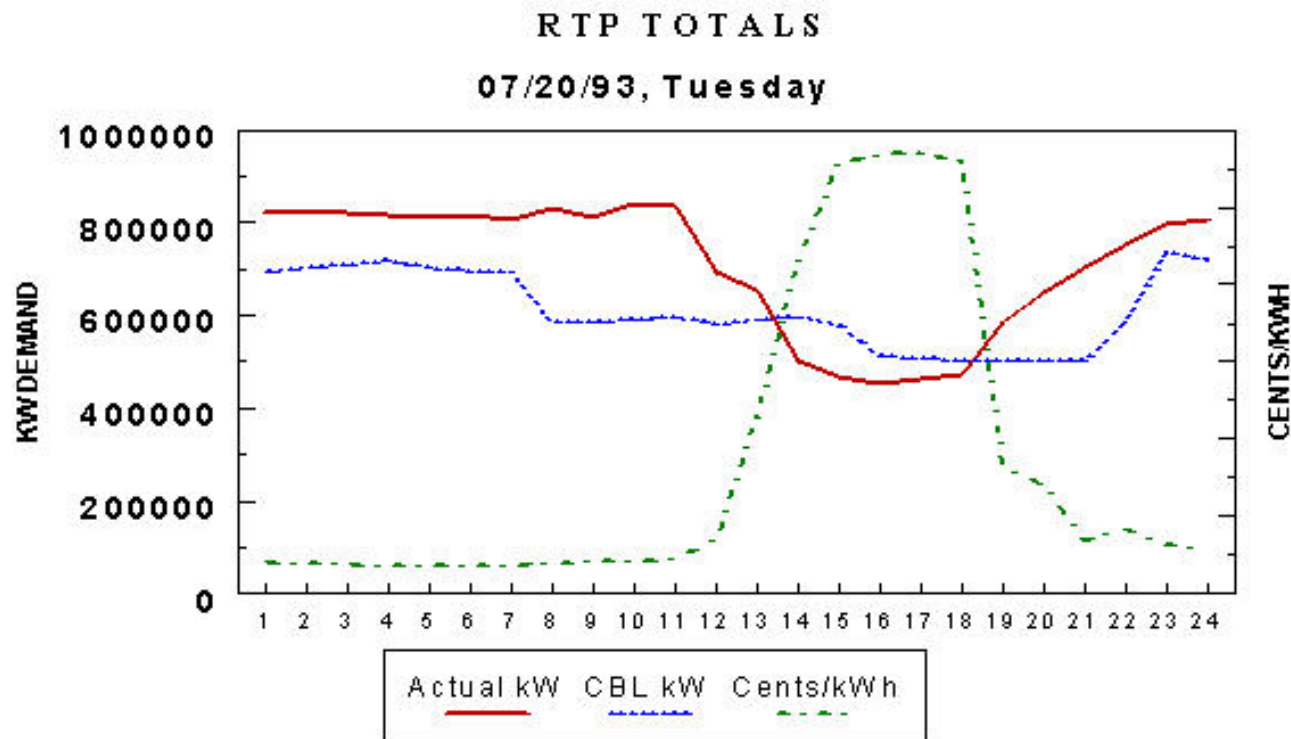


# RTP Impact is Predictable





# RTP Totals – Georgia Power





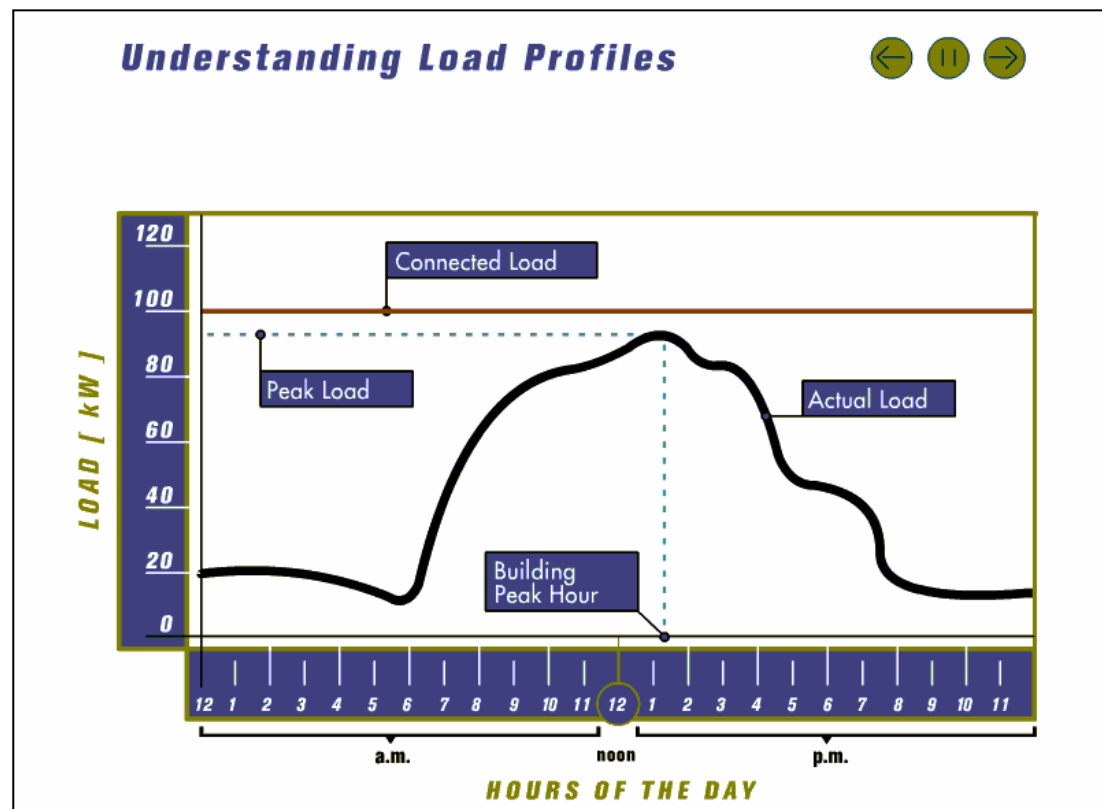
# Lessons Learned from RTP

- RTP programs can offer significant load shifting benefits; however, most of the load response comes from relatively few customers.
- Certain types of customers are more likely than others to respond to RTP.
- A variety of customers can respond to prices.
- Customers join RTP to save money.
- Customers do not like unmitigated price volatility.
- RTP programs have revenue stability issues for utilities as well as customers.
- With two-part RTP rates, utilities and customers often prefer simpler CBLs.
- RTP programs have been successfully combined with interruptible programs.
- Education is key for successful RTP programs.



# Understanding Capacity vs. Energy

Flash Animations illustrate key concepts





# Primary Load Management Opportunities

- Energy Management Systems
- HVAC (up to 50% of commercial load)
- Lighting (~30% of commercial load)
- Process Changes (industrial)
- Pumping (MWW/Ag)
- Backup Generation (? - emissions)



# Principal Load Management Programs

- Load Curtailment (Com'l/Ind.)
- Thermal Storage (Com'l/Ind.)
- Municipal/Agricultural Pumping
- Pricing Mechanisms (e.g., Real Time Pricing)
- Distributed Generation
- Possible: Back-up Generation using environmental dispatch criteria